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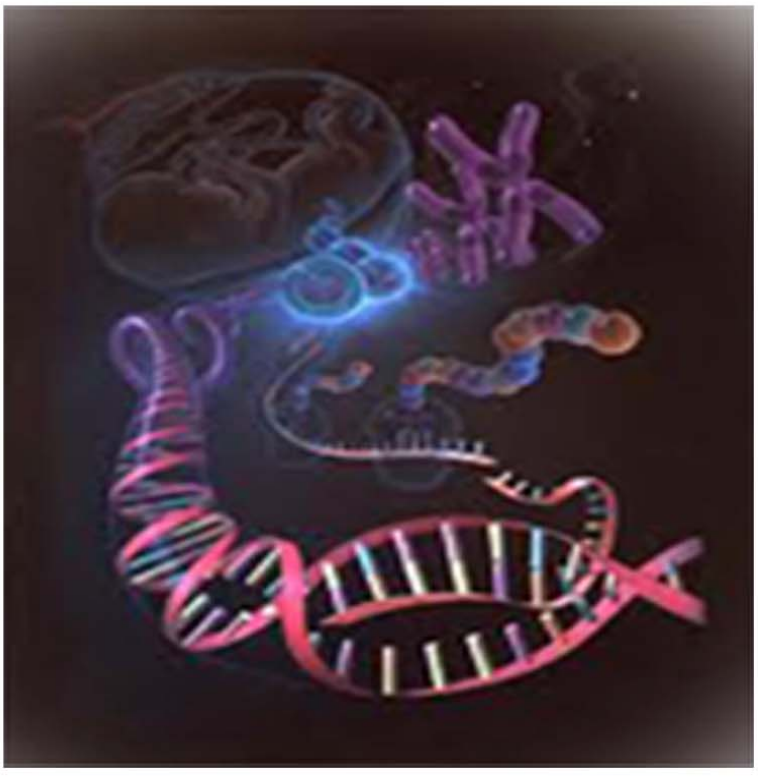

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Research Paper

MONTHLY VARIATION OF BIOCHEMICAL COMPOSITION OF GONIA (*LABEO GONIUS*) COLLECTED FROM BANGLADESHI WATER

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Biochemical composition indicates the percentage of many important nutrients that are essential to the human body. The study was conducted to determine the chemical composition of *Labeo gonius* bio based on the moisture. Comparative analysis of several estimated parameter (using AOAC, 1990 method) suggest a definite monthly variation from the point of nutritional aspect of *Labeo gonius*. The highest value of crude protein and moisture was found in May, while lipids, carbohydrates, ash and crude fiber were in July and August, respectively. Crude fiber was absent in April, May and August, but present in a very high amount in July. Furthermore, the value of the fat suddenly increasing in a very high amount in July. Changes in the water and fat indicate that while obviously increased fat content, there was a decrease in the water content due to heavy feed during this period. In addition to the fat and protein content was lower in August may be due to the breeding season gonia.

Keywords: *Labeo gonius*, Protein, Seasonal variation

INTRODUCTION

Gonia, *Labeo gonius* (Hamilton) is a common species of minor carps under Cyprinidae family distributed in natural waters of Pakistan, India, Nepal and Myanmar (Talwar and Jhingran, 1991). In Bangladesh this fish is normally captured from the natural sources belonging to *haors, baors, beels,* rivers, etc. of Kishoreganj, Narsingdi and Noakhali districts and now being cultured in captive condition (DoF, 2012).

Moisture, protein, fat and ash as major components and carbohydrates, vitamins and minerals as minor components form the main constituents of fish body (Begum and Minar, 2012). Protein is considered as the main building block for the animal body. For human diet most of the portion comes from the fish and fisheries product (Minar *et al.,* 2012a). Fish protein is highly digestible compared with other protein sources. It consists of all the 10 essential amino acids in

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an amount desirable for human consumption. Fish protein is very rich in amino acid such as methionine, lysine and tryptophan low in comparison with mammalian protein (Begum *et al.,* 2012). Besides fishes is a rich source of essential nutrients required for supplementing both infant and adult diets (Minar *et al.,* 2012b; Azim *et al.,* 2012).

Among the 56 fresh water fish species in Bangladesh (Mahfuz *et al.,* 2012) *Labeo gonius* is one of them (DoF, 2012). Hence forth, few studies such as spawning habits and early stages in the development *of L. gonius* by Ahamed (1944), life history of gonia by Mookerjee and Ganguli (1949), length-weight relationship about mature female of *L. gonius* by Chondar (1972), biology of *L. gonius* by Permeshwaran *et al*. (1974), relative condition factor and length-weight relationship by Dars *et al.* (2010), age and growth by Chatterji (1992), seasonal variation of protein and amino acid at India by Deka *et al.* (2012a) and Impact of seasonal and habitat on the composition of gonia fish at India by Deka *et al.* (2012b) were determined in several countries except Bangladesh.

Therefore the present study was concentrated on *Labeo gonius*, an endangered fish species in Bangladesh to assess its nutritional composition with special reference to protein in four different months of the year.

MATERIALS AND METHODS

Sample Collection

A total number of 16 *L. gonius* samples were collected Chamtaghat area, Mymensingh Bangladesh (Figure 1 indicates the collection place of fish) during April to August. Then the samples were brought into the Laboratory of Fish nutrition, Bangladesh Agricultural University, Mymensingh for biochemical composition

Figure 1: Collection Place of Fish

Preparation of the Sample for the Test

The sample was cut into very small pieces for testing various examinations. Determination of moisture content of the raw fish was conducted by AOAC method (AOAC, 1990). The crude protein of the fish was determined by Micro-Kjeldhal method (Pearson, 1999). The estimation of fat content of experimental raw fish had been accomplished by Bligh and Dryer method (Bligh and Dryer, 1999). The fresh raw samples (2/3 g) were minced, weighed and ignited in the crucible. Then it was transferred in the Muffle Furnace held at dark red at a rate of 550 ^{0}-600 ^{0}C for 6-8 h until the residue was white. Finally the percentage of ash content was calculated.

Calculation of Moisture

$$\%\, of\ moisture = \frac{weight\ loss}{original\ weight\ of\ the\ sample\ taken} \times 100$$

Calculation of Protein

The percentage of nitrogen I sample was calculated by the following formula-

% of N_2 = (Titration reading-blank reading) × Strength of Acid × 100/5 × 100/ weight of the sample. For most routine purpose the % of protein in the sample is the calculated by multiplying the % of N_2 with an empirical factor 6.25 for the fish.

% of the protein = % of total N_2 × 6.25

Calculation of Fat

$$\%of\ fat = \frac{weight\ of\ the\ residue}{Weight\ of\ the\ sample\ taken} \times 100$$

Calculation of Ash

$$\%of\ Ash = \frac{weight\ of\ dry\ sample}{Original\ weight\ of\ the\ sample\ taken} \times 100$$

Carbohydrate Content

There is no single method suitable for determining total carbohydrate in all tissues and, apart from the indirect infrared method mentioned earlier under protein, the methods are not straight-forward. For these reasons it is common to estimate carbohydrate (c) by difference.

C (%) =100 – P – W – F – A

where P is percentage protein (Nitrogen × 6.25), W is percentage water and F is percentage of fat and A is percentage of ash.

Data Analysis

The results obtained were analyzed statistically by performing ANOVA and Tukey's tests where there were significant differences. Significance level was set to an alpha level of 0.05 (Sokal and Rolf, 1974). Statistical significance is indicated with appropriate letters on the data tables.

RESULTS AND DISCUSSION

The amount of moisture, lipid, crude protein, ash, crude fibre and carbohydrate in different months are given in Table 1.

Seasonal Variation

The average value of moisture, lipid, crude protein, ash, lipid, crude fibre and Carbohydrate percentage (%) was 71.74, 5.23, 16.45, 5.52, 0.65, and 0.87 respectively. The highest value of moisture and crude protein was found in May, lipid, crude fibre and Carbohydrate was in July and ash

Table 1: This Table Shows The Significance in Variations in Fish Muscle of Gonia in Different Months

Month	Moisture (%)	Lipid (%)	Crude Protein (%)	Ash (%)	Crude fibre (%)	Carbohydrate (%)
April	72.67[b]	4.73[b]	17.21[b]	5.21[c]	nil[b]	0.18[c]
May	72.84[a]	3.92[d]	17.23[a]	5.87[b]	nil[b]	0.14[d]
July	69.06[d]	8.28[a]	15.85[c]	3.83[d]	0.65[a]	2.33[a]
August	72.42[c]	4.02[c]	15.54[d]	7.19[a]	nil[b]	0.83[b]
Average	71.7475	5.2375	16.4575	5.525	0.65	0.87
Average° S.D	71.75°1.80	5.23°2.06	16.46°.89	5.53°1.40	0.65	0.87°1.02
Average° S.E.M	71.75°.90	5.23°1.03	16.46°1.03	5.53°.70	0.65	0.87°.51

Note: Values with different superscripts in a row are significantly different (one way ANOVA followed by Duncan test, $p<0.05$)

in August respectively. Crude fibre was absent in April, May and August but present in a very high amount at July. In addition the value of fat suddenly increasing in a very high amount at the month of July. Changes in water and fat indicate that while fat content evidently increased, there was a decline in water content due to heavy feeding during this period, which is in good agreement with previously reported results by Huss (1988; 1995). Besides the fat and the protein content was lower in the month of August may be due to the breeding season of gonia.

Moisture Variation

Moisture content was significantly different (p<0.05) from one month to another though in the same fish (Table 1). The maximum moisture content was higher in May but lower in July. Like other fishes it has the greater percentage of moisture and may vary according to size, sex, season of the year (Mahfuz *et al.,* 2012; Minar *et al.,* 2012b; Azim *et al.,* 2012; Begum and Minar, 2012).

Protein Variation

The protein percentage show significant variations (p<0.05). The highest value of protein was found in May and lowest in August. Deka *et al.* (2012a) found highest amount of protein in muscle and liver tissue in pre-monsoon (138.22° 6.82 and 148.41° 8.96) and the lowest was observed in retreating monsoon (42.8° 1.49 and 52.40° 1.41) where the fishes were collected from the lotic habitat and similar result from the lentic habitat also. Besides he found a comparatively lower protein content throughout the season in case of lentic habitat. The present result showed that this fish has a good source of protein and helpful to mitigate the protein demand of the people.

Lipid Variation

Lipid content (moisture basis) varied significantly (p<0.05) between species. The average value of lipid in gonia was 5.23 and it was higher when compared to some native fish such as *G. chapra, C. soborna, A. punctata, C psendeutropius atherinoides* where the values of lipid was ranged from 4.55, 3.99, 4.5, 1.87 respectively (Begum and Minar, 2012). The highest fat percentage was July while the lowest was in May. Deka *et al.* (2012b) found highest amount of lipid (301.00° 2.73 mg/g) in lotic habitat during retreating monsoon season at India. And more or less similar result was found in case of lentic habitat. The presents study depicts that the variation in the level of lipid may be due to season which in turn affect the fish diet. Increased amount of lipid was found in July. It may be noted that both the habitat condition along with the changes of season have a significant impact on the synthesis of fat in fish.

Ash Variation

Ash may be defined as the residue that lacks water and volatile constituents containing carbon dioxide, oxides of nitrogen, etc. The ash percentage was higher in July and lower in August when subjected to experiment. The average values was 5.53° 1.40 which is more than *Labeo bata* (Mahfuz *et al.,* 2012) and some other small fishes of Bangladesh such as *G. chapra, C. soborna, A. punctata, C psendeutropius atherinoides, T. ilisha, M. rosenbergii, P. monodon is* 1.68, 1.54, 2.87, 1.92, 2.27, 2.68 and, 2.91 respectively (Begum *et al.,* 2012). But Chowdhury (1981) found the values of ash was very high and may be due to habitat, season, sex and size in fishes.

Crude Fibre and Carbohydrate Variation

Most remarkable result is the absence of Crude fibre in all months except July. Besides The percentage of Carbohydrate showed significant variation from one to another month of the year.

The present work has elucidated that the nutrient composition of this species might be a good source of protein. In addition the nutrient composition was found vary to the other authors for the same fish (Deka *et al.,* 2012). The proximate composition of a particular species often varies from one to another region. The main cause of change is may be due to amount and quality of food, sex, season, size, habitat along with its movement it makes (Deka *et al.,* 2012; Minar *et al.,* 2012a; Begum *et al.,* 2012; Begum and Minar, 2012). Besides some physiological reasons and change of environmental condition might greatly affect the proximate composition (Boran and Karacam, 2011).

REFERENCES

1. Ahamed N (1944), "The Spawning Habitats and Early Stages in the Development of the Carp*. Labeo Gonius* (Hamilton), with Hints for Distinguishing Eggs, Embryos And Larvae of *Labeo gonius*, *Cirrhinus mrigala* and *Wallagonia attu"*. *Proc nat. Inst*. *Sci. India,* Vol. 10, No. B (3), pp. 85-98.
2. AOAC (Association of Official Agrichemicals) (1990), "Official Methods of Analysis of the Association of Official Agricultural Chemist", K HeIritz (Ed.), 15th Edition, Vol. 2, pp. 685-1298, Association of Official Analytical Chemists, Inc., Suite 400, 2200 Wilson Boulevard, Arlington, Virginia 22201 USA. .
3. Azim M A, Islam M R, Hossain M B and Minar M H (2012), "Seasonal Variations in the Proximate Composition of Gangetic Sillago, *Sillaginopsis panijus* (Perciformes: Sillaginidae)", *Middle-East Journal of Scientific Research*., Vol. 11, No. 5, pp. 559-562: ISSN 1990-9233. IDOSI Publications.
4. Begum M and Minar M H (2012), "Comparative study about body composition of different sis, shell fish and ilish; commonly available in Bangladesh", *Trends in Fisheries Research.* Vol. 1, No. 1, pp. 38-42.
5. Begum M, Akhter T and Minar M H (2012) "Analysis of the Proximate Composition of Domesticated Pangus (*Pangasius hypophthalamus*) in Laboratory Condition", *Journal of Environmental Science and Natural Resources,* Vol. 5, No. 1, pp. 69-74.
6. Bligh E G and Dyer W (1959), "Total Lipid Extraction and Purification", *Can, J. Biochem. Physiol.*, Vol. 37, pp. 99-110.
7. Boran G and Karacam H (2011), "Seasonal Changes in the Proximate Composition of some Species from the Black Sea", *Turkish journal of fisheries and Aquatic Science,* Vol. 11, pp. 01-05.
8. Chatterji A (1992), "Age and Growth of Labeo gonius (Cyprinidae) in Kali River, Uttar Pradesh, India", *Asian Fisheries Sciences*, Vol. 5, pp. 257-260, Asian Fisheries Society, Manila, Philipines.
9. Chondar S L (1972), "The Length-Weight Relationship of Mature Female *Labeo gonius* (Hamilton) from the Keetham Reservoir", *J. Inland. Fish. Soc. India*, Vol. 4, pp. 216-217.
10. Chowdhury M F A (1981), "Study on the Chemical Composition and Nutritive Quality

of Some Freshwater Zeol Fishes of Bangladesh", M.Sc Thesis, Bangladesh Agricultural University, Mymensingh.

11. Dars B A, Narejo N T and Dayo A (2010), "Relative Condition Factor and Length-Weight Relationship of a Carp, *Labeo gonius* (hamilton) from Keenjhar Lake, District Thatta, Sindh, Pakistan", *Sindh Univ. Res. Jour. (Sci. Ser.),* Vol. 42, No. 2, pp. 67-70.

12. Deka B K, Mahanta R and Goswami U C (2012a), "Seasonal Variation of Protein and Essential Amino Acid Contents In *Labeo Gonius* From Lotic and Lentic Water Bodies", *World J. Life Sci. and Medical Research,* Vol. 2 , No. 2, pp. 71.

13. Deka B K, Mahanta R, and Goswami U C (2012b), "Impact of Seasonal and Habitat Variation on Compostion of Total Lipid Content in Mucle and Liver of *Labeo gonius* (Ham)", *International Journal of scientific and Research Publications,* Vol. 2, No. 6.

14. DoF (2012), "Fishery Statistical Yearbook of Bangladesh, Fisheries Resources Survey System" Department of Fisheries, Ministry of Fisheries and Livestock, Government of the Peoples' Republic of Bangladesh, Dhaka, p. 89.

15. Huss H H (1988), "Fresh Fish: Quality and Quality Changes", p. 132, FAO. Rome, Italy.

16. Huss H H (1995), *Quality and Quality Changes in Fresh Fish*, p. 348, FAO. Rome.

17. Mahfuj M S E, Hossain M B and Minar M H (2012), "Biochemical Composition of an Endangered Fish, *Labeo bata* (Hamilton, 1822) from Bangladesh Waters", *American Journal of Food Technology,* Vol. 7, pp. 633-41.

18. Minar M H, Adhikary R K, Begum M, Islam M R and Akter T (2012a), "Proximate Composition of Hilsha (*Tenualosa Ilisha*) In Laboratory Condition", *Bangladesh Journal of Progressive Science and Technology,* Vol. 10, No. 1, pp. 057-060.

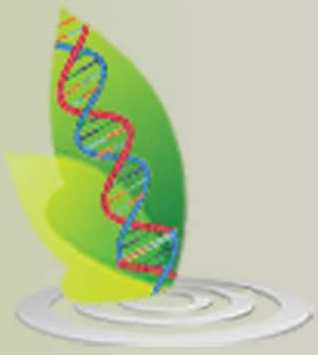
19. Minar M H, Adhikary R K, Mahbub K R, Bagum M and Islam M R (2012), "Effects of 10% Concentrations of Salt, Garlic and Coriander on the Quality of Smoked Hilsa Fish (*Tenualosa ilisha*)", *American Journal of Food Technology*, Vol. 7, No. 8, pp. 501-505.

20. Mookerjee H K and Ganguli D N (1949), "On the Life History of the Carp, *Labeo gonius* (Ham)", *Proc. Zool. Soc*. , Vol. 2, No. 2, pp. 173-174, Bengal, Calcutta.

21. Pearson D (1999), "Pearson's Composition and Analysis of Foods", University of Reading.

22. Sokal R R and Rolf F J (1974), "Introduction to Biostatistics". In W H Freeman (Ed.), 2nd Edition, p. 363, New York, USA.

23. Talwar P K and Jhingran A G (1991), "Inland Fishes of India and Adjacent Countries", Vol. 8 No. 1. A. A., p. 541, Balkema, Rotterdam.



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